

Claims

1. An ion exchange process using U-tube principle consisting of two connected compartments with internal backwashing utilizing controllable backwashing ports located below the nozzle bed in order to remove broken resin particles, impurities or lumps of sizes larger than the nozzle openings.
2. An ion exchange process according to claim 1 in which the backwash process is conducted only if the pressure drop of the service flow increases significantly, backwashing the resin at the second compartment is conducted by passing the backwash fluid with controlled flowrate through the inlet port at the first compartment and outflowing through the backwash outlet port located below the nozzle bed, backwashing the resin at the first compartment is conducted by passing the backwash fluid with controlled flowrate through the outlet port at the second compartment and outflowing through the backwash outlet port located below the nozzle bed.
3. An ion exchange process according to claim 1 in which the backwash process is considered only if the pressure drop of the service flow increases significantly; backwashing process is conducted by passing the backwash fluid through the inlet port located at the bottom of the U-type tube consisting of two connected compartments and outflowing through the outlet ports located below the upper nozzle beds in order to remove broken resin particles, impurities or lumps of sizes larger than the nozzle openings;
backwashing the resin in the first compartment is conducted by closing the backwash port below the upper nozzle bed of the second compartment and flowing the backwash fluid through the bottom inlet passing the resin bed in the first compartment and outflowing through the backwash port located below the upper nozzle bed of the first compartment; backwashing the resin in the second compartment is conducted by closing the backwash port below the upper nozzle bed of the first compartment and flowing the

backwash fluid through the bottom inlet passing the resin bed in the second compartment and outflowing through the backwash port located below the upper nozzle bed of the second compartment; simultaneous backwashing of both compartments is conducted by opening both backwash ports of the first and second compartment and flowing the backwash fluid through the bottom inlet passing the resin beds in the first and second compartments and outflowing through backwash ports below the nozzle beds of the first and second compartments.

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4. An ion exchange process using modified U-tube of 180° angle (vertical straight tube) equipped with upper and lower bed with internal backwashing utilizing a controllable backwash port located above the lower nozzle bed in order to remove broken resin particles, impurities or lumps of sizes larger than the nozzle openings.

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5. An ion exchange process according to claim 4 in which the backwash process is conducted only if the pressure drop of the service flow increases significantly; backwashing the resin is conducted by passing the backwash fluid with controlled flowrate through the lower port located above the lower nozzle bed and outflowing through the backwash outlet port located below the upper nozzle bed.

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